Section C - Statement of Work UNDERWATER EXPLOSION TESTING SUPPORT

Nature of Services to be Performed

The contractor will be required to provide engineering and technical analysis, logistic and instrumentation support, and design support at a Test Facility that is capable of conducting underwater explosion (UNDEX) testing programs. Capabilities must include on site engineering analysis and support as well as onsite design capabilities in a full range of disciplines relating to surface ships and submarines.

Background

The Naval Surface Warfare Center, Carderock Division (NSWCCD) is tasked to supply research, development, testing and evaluation under the cognizance of the U.S. Navy. UNDEX testing is a major part of this mission and requires specialized Test Facilities to perform the work. One of the principal focuses is structural technology development initiatives across a broad spectrum of surface ship and submarine technologies. This involves model and full scale testing to validate performance and determine physical mechanisms of shock phenomena in ship type structures. Experimental facility and associated engineering and system support must be used to effectively conduct model, full scale and equipment test and evaluation as well as support structural technology development. Within the scope of work outlined here, the contractor shall provide the test facility personnel, services, equipment, material, and engineering expertise essential to successful task performance. The Statement of Work in the Delivery Order shall define the work to be performed in detail. The Delivery Order will also specify the required delivery date for the completion of each task.
Scope of Work

In the performance of tasks under this contract the contractor may be tasked to:
provide engineering and technical services
install and operate Government Furnished Equipment (GFE)
conduct UNDEX testing
install instrumentation sensors and equipment for testing on site as well as offsite
operate instrumentation to record and reduce test data
download test data in a binary format compatible with Carderock software
provide engineering analysis and design support as required to resolve test problems and continue operations
process test data into report format including video and photographic grade pictures on site, and
provide necessary support staff and equipment to support ship equipment qualification IAW MIL standards and specifications.

The contractor shall perform task assignments within the below listed technical areas both on site and at off site facilities including onboard ships.

The government will provide Technical and Management Coordination for the assigned tasks. The Delivery Order will specify for which areas the contractor is responsible.

3.1 Heavyweight MIL-S-901D Shock Qualification Testing

The contractor shall perform MIL-S-901D heavyweight shock testing on site using Navy approved equipment provided by the contractor except for GFE as specified in the individual task statements. The contractor shall be able to perform the following as tasked:
Design, fabricate and install test equipment using Navy approved Shock Test platforms.
Install test equipment on the foundations and equipment being tested.
Produce and implement a test equipment plan including checkout, operation, reducing and processing all instrument data. (0-50 channels). Must also be able to download information in a binary format compatible with Carderock Division software.
Install and operate high-speed cameras.
Prepare and issue preliminary and final test results with high-grade quality including photo quality images on site.

As part of the test support, the contractor shall determine the structure/equipment/devices applicable to specific tests and develop designs for arrangements of all mechanical elements necessary to perform the tests. This includes rigging and support mechanisms, test beds, hydraulic jacks and attachments, and load cells. Mechanical designs must be able to be done on site and provide for safe application of all test loads including dynamic, static and fatigue loads with engineering support data available. The contractor must be able to perform instrumentation installation and performance checks during the conduct of the experiments at laboratory facilities, Navy and contractor facilities, field sites, and aboard ships.

3.2 Medium Weight, Light Weight, and Vibration Qualification Tests
The contractor shall conduct Medium Weight, LightWeight and Vibration Qualification Tests IAW applicable MIL Standards and Specifications as specified in assigned tasks.

3.3 Miscellaneous UNDEX Projects

The contractor shall perform the necessary support to conduct non-standard UNDEX Projects. These are test items for which the standard MIL-S-901D test method is not appropriate. This capability should include the ability to conduct on site engineering analysis as required to develop guidance and necessary test plans to satisfy the desired Shock Test Specification.
Once the proposed test scheme is approved, the contractor shall provide the engineering, design, fabrication, test array material, test personnel, instrumentation and reporting that will be required. This will include the fabrication of miscellaneous test items from drawings and plans that may be government furnished. Test items will range from special equipment installations to complex structures and foundations. Materials can include HY steels, stainless steel, aluminum and various grades of carbon steel. Contractor shall be able to get plastics and composites work done as required.

3.4 Personnel

The contractor is required to provide personnel with education and experience levels in the labor categories shown below.
Key Personnel

Senior Test Engineer – (1) Shall have a BS degree in engineering with at least 5 years experience in shock test planning, test design, test operations, test inspections, failure analysis, and reporting. The Senior Test Engineer should have demonstrated experience in the supervision and management of test operations and test personnel during shock and vibration testing. Should have strong experience in setting and maintaining schedules, budgets and project reporting. This experience should include demonstrated ability to technically, administratively, and contractually coordinate projects with a variety of engineering and craft requirements.

Instrumentation Engineer – (1) Shall have a BS in Electrical or Electronic Engineering and 2 years experience or 5 years experience as an Instrumentation Technician with experience in designing and implementing Instrumentation plans and procedures for testing. Familiar with calibration, data retrieval and reduction systems, test equipment calibration and certification, and data conversion into various formats. Should have demonstrated familiarity with the use of high-speed cameras and photography (stills and video). Must have familiarity with ships and ship systems and testing of those systems.

Equipment Installation Supervisor – (1) Shall have 10 years experience in installation, testing of operation of surface ship and submarine equipment in accordance with applicable specifications, and drawings. Should have demonstrated ability to supervise and direct multiple simultaneous trade operations in a safe and efficient manner while working from oral and written instructions. Must have at least 10 years experience in directing and supervising test operations and facilities to meet the requirements of multiple customers conducting test operations simultaneously. This experience must include the ability to design and review designs for test fixtures, materials, and equipment with an understanding of a variety of installation techniques to accomplish desired results. Must have at least 10 years experience related to shock and vibration testing on shipboard equipment, systems, and installation methods. Must have demonstrated at least 10 years experience in the areas of structural design of foundations, and fabrication and installation of foundations and fixtures for surface ship and submarine equipment testing.

Senior Engineer – (1) Shall have a minimum of a BS degree in engineering and 10 years experience in progressively responsible positions in the areas of shock, UNDEX testing, structural dynamics, design, and explosive safety. Demonstrated 10 years experience in management and direction of shock test operation, shock test fixture design, test plan development, and engineering evaluation of test results.

Non-Key Personnel –

Instrumentation Technician and Mechanical Technician - Installs, repairs, maintains, and adjusts indicating, recording, telemetering, and controlling instruments used to measure and control variables, such as pressure, flow, temperature, motion, force, and chemical composition, using hand tools and precision instruments. Disassembles malfunctioning instruments, and examines and tests mechanism and circuitry for defects. Troubleshoots equipment in or out of control system and replaces or repairs defective parts. Reassembles instrument and tests assembly for conformance with specifications, using instruments, such as potentiometer, resistance bridge, manometer, and

pressure gauge. Inspects instruments periodically and makes minor calibration adjustments to insure functioning within specified standards. May adjust and repair final control mechanisms, such as automatically controlled valves or positioners. May calibrate instruments according to established standards.

Shipfitter - Installs or repairs water, steam, gas or other types of pipe and pipefittings. Work involves most of the following: Laying out work and measuring to locate position of pipe from drawings or other written specifications; cutting various sizes of pipe to correct lengths with chisel and hammer, oxyacetylene torch or pipe-cutting machines; threading pipe with stocks and dies, bending pipe.

Welder - Welds metal components together to fabricate or repair products, such as machine parts, plant equipment, mobile homes, motors and generators, according to layouts, blueprints or work orders, using brazing and a variety of arc and gas welding equipment. Welds metal parts together, using both gas welding or brazing and any combination of arc.

Machinist - Produces replacement parts and new parts in making repairs of metal parts of mechanical equipment. Work involves most of the following: Interpreting written instructions and specifications; planning and laying out of work; using a variety of machinist’s hand tools and precision measuring instruments; setting up and operating standard machine tools; shaping of metal parts to close tolerances; making standard shop computations relating to dimensions of work, tooling, feeds, and speeds of machining; knowledge of the working properties of the common metals; selecting standard materials, parts, and equipment required for this work; and fitting and assembling parts into mechanical equipment. In general, the machinist’s work normally requires a rounded training in machine-shop practice usually acquired through a formal apprenticeship or equivalent training and experience.

Crane Operator - Operates heavy equipment such as cranes, clamshells, power shovels, motor graders, heavy loaders, carryalls, bulldozers, rollers, scrapers, and large industrial tractors with pan or scrapper attachments. Equipment is used to excavate, load or move dirt, gravel or other materials. Operator may read and interpret grade and slope stakes and simple plans. May be required to grease, adjust and make emergency repairs to equipment.

Typist/Word Processor - Uses a knowledge of varied and advanced functions of one software type, a knowledge of varied functions of different types of software, or a knowledge of specialized or technical terminology to perform such typical duties as: Editing and reformatting written or electronic drafts. Examples include: correcting function codes; adjusting spacing and formatting; and standardizing headings, margins, and indentations. Transcribing scientific reports, lab analyses, legal proceedings, or similar material from voice tapes or handwritten drafts. Work requires knowledge of specialized, technical, or scientific terminology. Work requires familiarity with office terminology and practices; incumbent corrects copy and questions originator of document concerning missing information, improper formatting, or discrepancies in instructions. Supervisor sets priorities and deadlines on continuing assignments, furnishes general instructions for recurring work, and provides specific instructions for new or unique projects. May lead lower level word processors.

Handyman - Assists one or more workers in the skilled maintenance trades by performing specific or general duties of lesser skill, such as keeping a worker supplied with materials and tools; cleaning working area, machine, and

equipment; assisting journeyman by holding materials or tools; and performing other unskilled tasks as directed by journeyman. The kind of work the helper is permitted to perform varies from trade to trade. In some trades the helper is confined to supplying, lifting, and holding materials and tools, and cleaning working areas; and in others the worker is permitted to perform specialized machine operations, or parts of a trade that are also performed by workers on a full-time basis.

Explosives Handler - Provide technical support and set standards for UXO personnel conducting ordnance response projects. Perform reconnaissance; classification; disposing; transporting; storage of UXO complying with Federal, state and local laws. Perform risk-hazard analysis; maintenance and operator checks on all team equipment. Plan and supervise range clearance operations. This individual shall have an explosion handling certification in accordance with the state in which the test facility is located.

3.5 Facilities - The contractor shall have an existing facility for shock testing shipboard equipment in the light, medium, or heavy weight test category. The facility shall have the following capabilities:

Conference Room: accommodate a minimum of 20 people,

Office Space: Minimum of two desk chairs and secure file cabinet,
Communication: Facsimile machine, two unrestricted phones, and internet hookup,

Drafting Capabilities: Produce engineering drawings, which fulfill the tasks in the Statement of Work, and

Instrumentation: Instrumentation systems for recording and processing up to 5 channels with ability to increase to a maximum of 15 channels (sensors-signal processing FM magnetic tape recorders or solid state recorders and appropriate data processing equipment).

3.6 Test Support Facility - The contractor shall have a test support facility with following capabilities:

1. Crane with a minimum of 70-ton lift at a 90-ft. radius. Access to portable cranes with lift capacity up to 50 tons.

2.On-site or access to a machine shop with a minimum of:

Comprehensive carbide tooling required for HY-steels and other exotic alloys as required.

High-pressure hydrostatic testing of hull penetrations on a regular basis before and after test series (requires high-pressure pump capability).

Ability to produce internal and external threads; capability of manufacturing all classes of fits of all basic dimensions.

The capabilities or access to the capabilities required to meet NAVSEA specifications (such as NAVSEA 0900-000-1000), MIL-STD Specifications, (such as MIL-STD-22), the requirements of DESIGN DATA SHEET specifications (such as DDS 110) and other Government specifications as required in the task order.

Additionally, the machine shop shall have on site or access to the following items:
1. Metal Machine Lathe
2. Vertical Boring Mill
3. Milling Machine - General milling capability and portable drilling and portable boring.

Available or have access to a ship fitting ship with the capabilities required to meet NAVSEA specifications (such as NAVSHIPS 0900-000-1000, NAVSEA 0900-006-9010), MIL-STD specifications (such as MIL-STD-22 and MIL-STD-246), the requirements of DESIGN DATA SHEET specifications as required in the task order.

Available or have access to a welding shop with the welding and weld inspection capabilities as required to meet-NAVSEA specifications, MIL-STD/specifications, the requirements of DESIGN DATA SHEET specifications (such as, DDS 110) and other Government specifications required in the task order.

Available or have access to a pipe shop with the capabilities to fabricate and install LP and HP-piping for ballasting test vehicles; ability to erect staging platforms; ability to work to NAVSEA specifications, MIL-STD specifications, the requirements of DESIGN DATA SHEET specifications, and other Government specifications required in the task order.

Available or have access to the capability to supply Temporary services such as 120 VAC 1single phase, 220 VAC 1 single phase, and 440 VAC three phase, electric power, LP and HP air service, heat and water to test vehicle.

Capability to store up to 2,000 pounds Class A bomb type IV explosives and 100 Class B electric blasting caps.

Have at least 2,000 square ft of secure, covered, heated storage with overhead crane service for equipment being tested and/or inspected.

Have three phase 440 Volt AC power on site with minimum amperage rating of 2000 amps. Have DC power at least 1000 KW 120/240 power. Have AC regulated of at least 45 KVA of 120/208 ‘Y’ power. The facility shall also have at least a 50 KVA resistive load bank and all necessary leads, connections, switch gear, and other support equipment necessary for load testing of electrical items being shock tested.

The test support facility shall be capable of detonating up to at least 125 pounds of HBX-1 underwater at a depth of 30 ft. The test area shall be at least 150’ x 200’ with water depth of 100 feet.

Data Requirements

Data to be provided shall be as specified in individual delivery orders and in accordance with DD Form 1423 and the Contract Data Requirements List (CDRL) attached to this RFP.

Conferences and Meetings

The contractor shall be available to attend meetings at the various facilities associated with the Carderock Division including Washington D.C., Carderock MD, Aberdeen MD, and various test sites as required and specified in the individual delivery orders.

Security Requirements

Tasks to be performed under this contract may be classified to the level of SECRET in accordance with the DD Form 254 Contract Security Classification attached to this contract.